

PALLMEX PMC

PALLADIUM COBALT ALLOY ELECTROPLATING PROCESS

INTRODUCTION

AUROMEX PALLMEX PMC is a new formulated high palladium content cobalt brightened alloying electroplating system. This high palladium content bright deposit process is specially designed to achieve the advantage of using cobalt the instead of using nickel to produce a low stress, high ductility and extreme good corrosion resistance, suitable for the plating of connectors, contacts and other electrical components as well as decorative articles. **AUROMEX PALLMEX PMC** is particularly suitable for use as substitutes or partial substitutes for several of the other precious metals, most notably gold and Rhodium plating thickness up to 5 microns. A palladium alloy undercoat for gold or Rhodium as a substitute for bright nickel improves the corrosion resistance of the coating.

PROCESS CHARACTERISTICS

- * **Reduced Material Cost**
 - (Substitute for gold and Rhodium)

- * **Proven Electrolyte**
 - Non-toxic electrolyte
 - Extreme economic
 - Easy maintenance
 - High tolerance to contamination
 - Stable process

- * **Improved Deposit Characteristics**
 - Minimal hydrogen inclusion
 - High ductility (6-8% elongation)
 - Low internal stress
 - True alloy
 - Exceptionally low porosity
 - High hardness

DEPOSIT CHARACTERISTICS

Appearance	: Fully bright, white
Purity	: 85-90% palladium, 10-15% cobalt
Density	: 11.0-11.5 g/cc
Hardness	: 400-500 Hv50g
Ductility	: Excellent
Porosity	: Excellent
Internal stress	: 50-120 N/mm ²
Corrosion resistance	: good (salt spray test)
Wearing resistance	: good

EQUIPMENT REQUIRED

Tank	: Polypropylene or PVC glass fiber reinforced tanks are suitable
Rectifier	: A standard D C power supply should be used with an ampere output capacity sufficient to meet the requirements of the plating operation. The power supply should be equipped with a Voltmeter, ammeter and step less control for accurate regulation of the current.
Filtration	: The solution should be filtered continuously through polypropylene or cotton cartridges to maintain clarity.
Agitation	: Moderate to vigorous agitation is necessary to maintain metal uniform metal distribution. Jet Stream and mechanical agitation at 7-14 m/min may be used.
Anodes	: Insoluble anodes should be used, Platinised Titanium anodes with an area sufficient to provide a maximum current density of 0.25A/dm ² are recommended.

MAKE UP INSTRUCTION

Palladium Complex :

For the preparation and maintenance of the solution, palladium is added in the form of Diammino-palladium complex (50%).

Preparation of the solution :

Pallmex PMC make up is supplied as a ready for use electrolyte, it contains all the necessary agents to make up the bath, but does not contain Palladium.

Materials required : for 10 litres of electrolyte

Palladium complex (50% pd metal)	80 grammes
Pallmex PMC Make Up electrolytes	10 litres
Pallmex PMC Brightener GTX	as required
Pallmex PMC Wetting Agent	
Sulphuric Acid	
Ammonium Hydroxide	

OPERATING CONDITIONS

	<u>Unit</u>	<u>Range</u>	<u>Optimum</u>
Metallic Palladium Content	g/l	3-6	4
Metallic Cobalt Content	g/l	0.3-0.8	0.5
Temperature	°C	25-40	35
Density	°Be	10-20	10
pH		8.0-9.0	8.5
Cathode current density	A/dm ²	1-2	1 (Vat)
		0.3-0.5	0.4
		(barrel)	(barrel)
Anode-to-Cathode Ratio		or higher	1:4
Agitation	m/min	3-5	4
Plating Rate	mgm/Amp-min	20-30	25
Time to deposit 1u at 1 A/dm ²	min	4-5	4.5

BATH MAINTENANCE

The Palladium metal content should be maintained at the recommended concentration (4 g/l) by periodic additions of Palladium complex, PMC replenisher R1 & R2 and stabiliser salt, as a guide, 100 gms palladium metal or 200 gms 50% palladium complex should be added together with one unit each of **Pallmex PMC** R1 (500 mls) R2 (200 mls) and stabiliser salt (100 gms) for every 4700 Amp-min.

The **Pallmex PMC** conducting salt should only be used to increase electrolyte specific gravity in high drag-out situations, which should be 10 °Be at 35°C. An addition of 20 g/l of conducting salt will increase the solution density by 1 °Be .

The **Pallmex PMC** wetting agent is used as an anti-pitting agent. The **Pallmex PMC** Brightener GTX is the basic brightener which affect the brightness and leveling of the deposit and is best replenished on the basis of deposit of deposit appearance.

pH CONTROL

The pH of electrolyte should be checked regularly and can be increased or decreased by the addition of 50% Ammonium Hydroxide or 20% v/v Sulphuric Acid Solution.

PACKING

Pallmex PMC make electrolyte	10 & 20 litre/ drum
Pallmex PMC Replenisher R1	500 mls/unit
Pallmex PMC Replenisher R2	200 mls/unit
Pallmex PMC Stabiliser salt	100 gms/unit
Pallmex PMC Wetting Agent	1,2 & 5 litre/bottle
Pallmex PMC Conducting salt	5,10 & 20 kgs./bottle
Pallmex PMC Brightener GTX	1,2 & 5 litre/bottle